UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

OFFICE OF
CHEMICAL SAFETY AND
POLLUTION PREVENTION

MEMORANDUM:

To: Beth Fertich

From: Jacquelyn Marchese, M.S.

Secondary Review: Kevin Sweeney, M.S.

Date: March 7, 2016

Subject: PRODUCT PERFORMANCE DATA EVALUATION RECORD (DER)

THIS DER DOES NOT CONTAIN CONFIDENTIAL BUSINESS INFORMATION

Note: MRIDs found to be **unacceptable** to support label claims should be removed from the data matrix.

DP barcode: 426140
Decision no.: 499915
Submission no: 964067
Action code: R310
Product Name: RF2212 EC
EPA Reg. No or File Symbol: 89459-IR
Formulation Type: liquid insecticide, RTU or dilute with water
Ingredients statement from the label with PC codes included:
20% Etofenprox PC: 128965
Application rate(s) of product and each active ingredient (lbs. or gallons/1000 square feet or per acre as appropriate; and g/m^2 or mg/cm^2 or mg/kg body weight as appropriate):
Use Patterns: RF2212EC is intended as an insecticide to be sprayed over agricultural crops, pasture, rangeland, industrial, urban, recreational and woodland areas by air or ground application. The insecticide can be used as packaged or with dilution and is currently labeled to be effective against adult mosquitoes, non-biting midges and biting flies.

I. Action Requested: The Risk Manager submitted 12 MRIDs and asked that that they be reviewed to determine if they support label claims against mosquitoes, non-biting midges, black flies, and other biting flies.

II. Background: This application has been coded as an R310, a new end-use product with registered source of active ingredient, requiring data review within the Registration Division only. The proposed product is relying on 11 previously reviewed studies and 1 new study, and have indicated that the use pattern and rate are similar to EPA Reg. No. 2724-791.

III. MRID Summary: (primary review attached for MRID 49564709)

47195610. Malone D. 2005. Field Efficacy Studies of Etofenprox, Ground ULV Application (South Carolina).

(1) **GLP or non-GLP:** Non GLP

(2) **Methods:** Twenty-five, adult, female *Ochlerotatus taeniorhynchus,* were field collected and placed in each exposure cage. Eight exposure cages were utilized per replicate, 4 were placed 50m from the applicator and 4 were placed 100m from the applicator. The experiment was replicated 4 times. The test product was applied at an average rate of 0.00356 lbs of a.i. per acre. Cages were kept in the field for 15 minutes after application and were transferred into clean holding cages. Mortality was recorded at 24 hours post application. Untreated control mortality was also determined.

(3) **Results:** Other than the group that, in error, did not receive the intended test rate of pesticide, mortality was about 90%, 24 hours post treatment. Knockdown, on average, was about 90%.

(4) **Conclusion:** This is an **acceptable** study that demonstrates that the product is efficacious against *Ochlerotatus taeniorhynchus* at the rate of 0.003565 lb of etofenprox/acre. Quick kill claims are also supported.

47195611. Malone, D. 2005. Field Efficacy Studies of Etofenprox, Ground ULV Application (Cayman Islands).

(1) **GLP or non-GLP:** Non GLP

(2) **Methods:** Twenty-five, adult, female *Ochlerotatus taeniorhynchus,* were field collected and placed in each exposure cage. Eight exposure cages were utilized per replicate, 4 were placed 50m from the applicator and 4 were placed 100m from the applicator. The experiment was replicated 5 times. The test product was applied at an average rate of 0.00337 lbs of a.i. per acre. Cages were kept in the field for 15 minutes after application and were transferred into clean holding cages. Mortality was recorded at 24 hours post application. Untreated control mortality was also determined.

(3) **Results:** After 24 hours, average mortality and knockdown were right around 90%.

(4) **Conclusion:** This is an **acceptable** study that demonstrates that the product is efficacious against *Ochlerotatus taeniorhynchus* at the rate of 0.00337 lb of etofenprox/acre. Quick kill claims are also supported.

47195612. Malone, D. 2005. Field Efficacy Studies of Etofenprox, Ground ULV Application (Florida – 1).

(1) **GLP or non-GLP:** Non GLP

(2) **Methods:** Twenty-five, adult, female *Culex nigripalpus,* were field collected and placed in exposure cages and 25 laboratory reared *Aedes albopictus* were placed in separate exposure cages. Eight exposure cages were utilized per replicate, 4 were placed 50m from the applicator and 4 were placed 100m from the applicator. The experiment was replicated 4 times. Four applications were conducted on a mixture of mostly *C. nigripalpus* and the 5th application was conducted on *Ae. albopictus* only. The test product was applied at an average rate of 0.00345 lbs of a.i. per acre. Cages were kept in the field for 15 minutes after application and transferred into clean holding cages. Mortality was recorded at 24 hours post application. Untreated control mortality was also determined.

(3) **Results:** All groups reached higher than 94% efficacy after 24 hours with the *Ae. albopictus* group exhibiting 96% and higher mortality throughout the experiment. On average knockdown was 90%, 20 minutes post treatment.

(4) **Conclusion:** This study demonstrates that etofenprox, when applied at a rate of 0.00345 lbs of a.i. per acre kills over 90% of *Ae. albopictus* and demonstrates similar efficacy against a mixture of mostly *Culex nigripalpus* mixed with other mosquito species. As this study demonstrates the effectiveness of the product against one of the required mosquito species, *Ae. albopictus,* it is **acceptable** in supporting efficacy claims for the proposed product. Quick kill claims are also supported.

47195614. Malone, D. 2006. Field Efficacy Studies of Etofenprox, Ground ULV Application (Mississippi).

(1) **GLP or non-GLP**: Non-GLP

(2) **Methods:** Twenty-five, adult, female *Anopheles quadrimaculatus,* were field collected and placed in each exposure cage. Eight exposure cages were utilized per replicate, 4 were placed 50m from the applicator and 4 were placed 100m from the applicator. The experiment was replicated 7 times. The test product was applied at an average rate of 0.001752 lb of a.i. per acre (replicated 3 times) and at an average rate of 0.00348 lb of a.i. per acre (replicated 4 times). Control mortality was too high for two of the replicates that received the 0.001752 treatment and are subsequently not reported. Cages were kept in the field for 15 minutes after application and were transferred into clean holding cages. Mortality was recorded at 24 hours post application. Untreated control mortality was also determined.

(3) **Results:** Reported mortality is too low for both application rates (less than 90%) and for knockdown.

(4) **Conclusion:** This study is **unacceptable** and does not support any claims for this proposed product.

47195615. Malone, D. 2007. Field Efficacy Studies of Etofenprox Ground ULV Application (Florida – 2).

(1) **GLP or non-GLP**: Non-GLP

(2) **Methods:** Twenty-five, laboratory reared, adult, female *Culex quinquinfasciatus,* were collected and placed in each of 12 exposure cages, the same was done for 25 laboratory reared, adult, female *Aedes aegypti.* Twenty-four exposure cages were utilized per replicate, 12 were placed 50m from the applicator and 12 were placed 100m from the applicator. One half of the cages were filled with *Aedes aegypti* and the other half were filled with *Culex quinquefasciatus.* The experiment was replicated 3 times. The test product was applied at an average rate of 0.00337 lbs of a.i. per acre. Cages were kept in the field for 15 minutes after application and were transferred into clean holding cages. Mortality was recorded at 24 hours post application. Untreated control mortality was also determined.
(3) **Results:** Two out of three rows of cages in each replicate for both species had an average mortality above 90% after 24 hours. In each replicate for both species, mortality for the third row was much lower with a low of 13% mortality. The same is true for the knockdown data. Two out of the three rows demonstrated knockdown at or around 90%, the other row, on average, demonstrated lower knockdown. The study directors attributed these failures to lack of exposure to the specimens in this row throughout the experiment.

(4) **Conclusion:** By discounting results from the third row, mortality for both species is acceptable. This study is **acceptable** and supports that the product kills *Culex quinquefasciatus* and *Aedes aegypti* at 0.00175 lbs of etofenprox/acre. Quick kill claims are supported.

47326002. Malone, D. 2007. Field Efficacy Studies of Etofenprox, Ground ULV Application.

(1) **GLP or non-GLP:** Non-GLP

(2) **Methods:** Twenty-five, laboratory reared, adult, female *Culex quinquinfasciatus,* were collected and placed in each exposure cage. Twelve exposure cages were utilized per replicate, 6 were placed 50m from the applicator and 6 were placed 100m from the applicator. The experiment was replicated 6 times. The test product was applied at an average rate of 0.001684 lbs of a.i. per acre for three of the applications and at 0.006519 lbs of a.i. per acre for 3 applications. Cages were kept in the field for 15 minutes after application and were transferred into clean holding cages. Mortality was recorded at 24 hours post application. Untreated control mortality was also determined.

(3) **Results:** Mortality for each replicate reached 100%, 24 hours post treatment. When averaging knockdown for all of the cages during all of the replicates, knockdown was greater than 90%.

(4) **Conclusion:** This study is **acceptable** and supports that the product works against *Culex quinquinfasciatus* at the rate of 0.00168 and 0.0065 lbs of etofenprox per acre. Quick kill claims are also supported.

47326003. Malone, D. 2007. Field Efficacy Studies of Etofenprox, Ground ULV Application.

(1) **GLP or non-GLP:** Non-GLP

(2) **Methods:** Twenty-five, laboratory reared, adult, female *Anopheles quadrimaculatus,* were collected and placed in each exposure cage. Twelve exposure cages were utilized per replicate, 6 were placed 50m from the applicator and 6 were placed 100m from the applicator. The experiment was replicated 2 times. The test product was applied at an average rate of 0.001776 lbs of a.i. per acre. Cages were kept in the field for 15 minutes after application and were transferred into clean holding cages. Mortality was recorded at 24 hours post application. Untreated control mortality was also determined.
(3) **Results:** Average mortality and knockdowm of the tested specimens was above 90%, 24 hours post treatment.

(4) **Conclusion:** This study is **acceptable** and supports that the product kills *Anopheles quadrimaculatus* at the rate of 0.001776 lbs of etofenprox per acre. Quick kill claims are also supported.

47326004. Townzen, K. 2007. Field Efficacy Evaluation of RF-2056 OL Against Adult Mosquitoes.

(1) **GLP or non-GLP:** Non-GLP

(2) **Methods:** About 50 field caught mosquitoes (85% *Aedes dorsalis*) were placed in each cage. Cages were placed at either 150 or 300 feet from the applicator. Three cages were sprayed per trial per distance from applicator and three untreated control cages were placed 50m upwind from the study. The study tested three rates of etofenprox (0.007 lbs of a.i. per acre, 0.0035 lbs of a.i. per acre, and 0.00175 lbs of a.i. per acre), and treatment with each rate was replicated twice. Cages were removed and mortality was assessed at 3, 12 and 24 hours post treatment. It does not appear that mosquitoes were transferred out of the cages into a clean holding container.

(3) **Results:** Twelve hours post treatment regardless of application rate received, >90% of all treated specimens perished.

(4) **Conclusion:** This study currently supports claims on a similar product and therefore is **acceptable** and supports etofenprox at 0.007, 0.0035, and 0.00175 lbs of a.i. per acre is effective in killing *Aedes dorsalis*.

47568004. Malone, D. 2008. Field Efficacy Studies of Etofenprox, Ground ULV Application.

(1) **GLP or non-GLP:** Non-GLP

(2) **Methods:** Approximately 25 female, laboratory reared *Anopheles quadrimaculatus* (2-5 days old) mosquitoes were placed in each cage. Three cages were placed 50m from applicator and 3 cages were placed 100m from applicator, and untreated control cages were placed upwind. Two replicates occurred during the experiment, each replicate tested a different formulation. Replicate 1 tested an etofenprox + D-Limonene formulation and replicate 2 tested etofenprox without D-Limonene. Cages intended for treatment received an average application of 0.001775 lbs of etofenprox per acre for D-Limonene formulation and an average of 0.001745 lbs of etofenprox per acre of the formulation without D-Limonene. Fifteen minutes after application, cages were removed from the treated area and the specimens were transferred to a clean holding container. Twenty-four hours post treatment, specimens were evaluated for mortality.

(3) **Results:** In all but 1 instance, mortality was greater than 90% 24 hours post treatment.

(4) **Conclusion:** This study is **acceptable** and supports the kills *Anopheles quadrimaculatus* at the rate of 0.00175 lbs of etofenprox per acre.

47595201. Malone, D. 2008. Field Efficacy Studies of Etofenprox, Ground ULV Application (*Anopheles*

***quadrimaculatus* and *Culex quinquefasciatus*)**

47624301. Malone, D. 2008. Field Efficacy Studies of Etofenprox, Ground ULV Application: (RF2056 OL): Final Report Amendment.

These MRIDs are the same document and are **supplemental.** They are an addendum to 47568004 and the information provided does not change the conclusions listed above.

49564709. Haas, K. 2014. Ground Field Mosquito Efficacy Studies of RF2212 EC: Final Report.

(1) **GLP or non-GLP**: Non GLP

(2) **Methods:** This study tested the proposed etofenprox product, RF2212 EC and an additional product RF2056C. Both contain 20% etofenprox; RF2212 EC, like the proposed product is diluted with water and RF2056C is diluted with oil. Six replications of the study were conducted in total, 4 tested RF2212 EC and the remaining 2 tested RF2056C. Additionally, two rates were tested in this study, etofenprox at 0.00175 lbs of a.i./acre and 0.0035 lbs of a.i. per acre. Each rate was replicated 2 times with RF2212 EC and once with RF2056C. RF2056C was treated as a positive control. Lab reared specimens of *Aedes albopictus* and *Culex quinquefasciatus* were tested in this experiment. In each replication, 18 cages and 4 untreated control cages were tested. Mortality was recorded at 12 and 24 hours post treatment.

(3) **Results:** On average, 90% or higher of treated specimens perished in the study.

(4) **Conclusion:** This study is **acceptable** and demonstrates that 0.00175 lbs of etofenprox per acre is effective in killing *Aedes albopictus* and *Culex quinquefasciatus*.

IV. EXECUTIVE DATA SUMMARY:

(A) The data submitted support that the proposed product kills numerous species of mosquitoes at varying rates of etofenprox. The acceptable mosquito species tested fulfill the requirement for a mosquito claim (*Aedes albopictus, Cules quiquefasciatus,* and *Anopheles quadrimaculatus*) at the lowest rate of 0.00175 lbs of etofenprox per acre.

None of the submitted studies cover black flies or biting flies and therefore, the inclusion of those flies on the proposed label is not supported.

V. LABEL RECOMMENDATIONS:

(1) No changes to the Directions for Use are suggested.

(2) The following marketing claims are acceptable: Kills mosquitoes

(3) The following marketing claims are unacceptable: Kills biting flies, kills black flies